PH 555: Non-Equilibrium Statistical Mechanics (3-0-0: 3)

Introduction to Statistical Methods
The random walk in one dimension, mean values and standard deviations, Gaussian limit of the binomial distribution, extension to several variables.

Non-equilibrium Phenomena
Approach to equilibrium, Liouville's theorem, detailed balance and the H-theorem, applications of the principle of detailed balance.

Simple Discussion of Brownian Motion
Fluctuations, random walk and Brownian motion, the Langevin equation, Fokker-Planck equation.

Kinetic Methods and Transport Theory
Boltzmann transport equation and applications.

Text Books and References:
1. C. Kittel, "Elementary Statistical Physics", Dover Publication Inc.
2. S. R. A. Salinas, "Introduction to Statistical Physics", Levant Books.
3. F. Reif, "Fundamentals of Statistical and Thermal Physics", Levant Books.
4. V. Balakrishnan, "Elements of Nonequilibrium Mechanics", Ane Books Pvt. Ltd.